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Craig A. Slavin

Applicant: Liu

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Title: Fuel Cell With Fuel Droplet
Fuel Supply

Group Art Unit: 1745

Examiner: Yuan

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
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Mail Stop Appeal Brief - Patents

**RESPONSE TO NOTICE OF NON-COMPLIANT
APPEAL BRIEF**

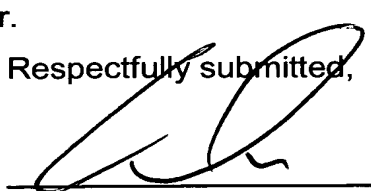
Sir:

In response to the Notice of Non-Compliant Appeal Brief dated October 4, 2005, attached hereto is a replacement Summary of Claimed Subject Matter section for use in conjunction with the remainder of the Appeal Brief filed on August 15, 2005. [See MPEP § 1205.03(B).] The replacement Summary of Claimed Subject Matter section includes a discussion of dependent claim 9. [See the end of section V-E.]

The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 08-2025. Should such fees be associated with an extension of time, applicant respectfully requests that this paper be considered a petition therefor.

10/13/05
Date

Respectfully submitted,


Craig A. Slavin
Reg. No. 35,362
Attorney for Applicant

Henricks, Slavin & Holmes LLP
840 Apollo Street, Suite 200
El Segundo, CA 90245
(310) 563-1458
(310) 563-1460 (Facsimile)

V. SUMMARY OF CLAIMED SUBJECT MATTER

A. Independent Claim 1

Independent claim 1 is directed to a fuel cell system. Referring to FIGS. 1 and 3, formal versions of which are reproduced below, one example of the claimed system comprises “a fuel cell stack [104] including a plurality of anodes.” [Spec. at page 4, lines 18-21.] The anodes, which are part of fuel cells 102, are identified by the word “anode” in FIG. 1 and reference character 106 in FIG. 3. Claim 1 also calls for “a **single** fuel supply apparatus [118] that supplies a plurality of fuel droplets [120] to **each** of the anodes.” [Spec. at page 5, lines 6-10.]

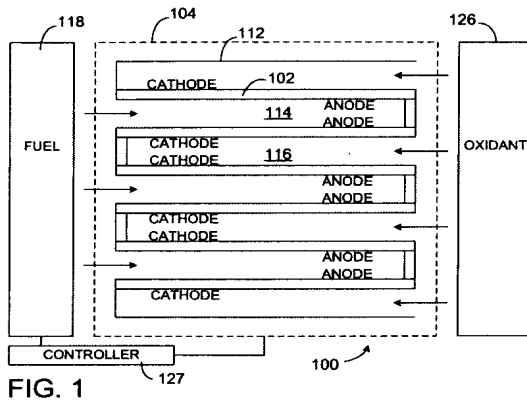


FIG. 1

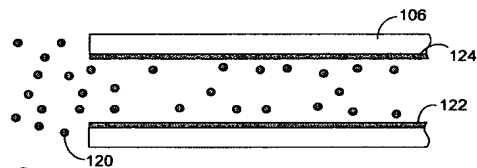


FIG. 3

B. Independent Claim 4

Independent claim 4 is directed to a fuel cell system. Examples of the claimed system, which comprises “a fuel cell [102] including at least one anode” and “a **thermal** drop ejector [128] that supplies a plurality of fuel droplets [120] to the at least one anode,” are illustrated in FIGS. 4, 7 and 8. [Spec. at page 4, lines 18-21; page 7, lines 9-21; and page 7, line 31 to page 8, line 9.]

C. Independent Claim 5

Independent claim 5 is directed to a fuel cell system. One example of the claimed system, which comprises “a fuel cell [102] including at least one anode” and

"a **piezoelectric** drop ejector [152] that supplies a plurality of fuel droplets [120] to the at least one anode," is illustrated in FIG. 9. [Spec. at page 4, lines 18-21; and page 8, lines 10-18.]

D. Independent Claim 6

Independent claim 6 is directed to a fuel cell system. One example of the claimed system, which comprises "a fuel cell [102] including at least one anode" and "a **flexensional** drop ejector [172] that supplies a plurality of fuel droplets [120] to the at least one anode," is illustrated in FIG. 13. [Spec. at page 4, lines 18-21 and page 9, lines 3-12.]

E. Independent Claim 8 and Dependent Claim 9

Independent claim 8 is directed to a fuel cell system. Referring to FIGS. 1 and 3, which are reproduced on page 2 of this Brief, one example of the claimed system comprises "a fuel cell stack [104] including at least one anode pair arranged such that the **anodes within the anode pair face one another and define a fuel passage [114] therebetween that extends from one anode in the pair to the other anode in the pair.**" [Spec. at page 4, lines 23-28.] The claimed system further comprises "fuel supply means [118] for supplying a plurality of droplets [120] to the fuel passage [114] between the at least one anode pair." [Spec. at page 5, lines 6-12.] The present application discloses a wide variety of **additional** structures for performing the claimed function. More specifically:

1. The fuel supply apparatus 118a illustrated in FIG. 4, which includes a thermal drop ejector 128, a manifold 146, and a fan 148, performs the claimed function. [Spec. at page 7, lines 9-21.]
2. The fuel supply apparatus 118b illustrated in FIG. 7, which includes a thermal drop ejector 128 and a fan 148, performs the claimed function. [Spec. at page 7, line 31 to page 8, line 2.]
3. The fuel supply apparatus 118c illustrated in FIG. 8, which includes a plurality of thermal drop ejectors 128, performs the claimed function. [Spec. at page 8, lines 3-9.]

4. The fuel supply apparatus 118d illustrated in FIG. 9, which includes a plurality of piezoelectric drop ejectors 152, performs the claimed function. [Spec. at page 8, lines 10-18.]
5. The fuel supply apparatus 118e illustrated in FIG. 13, which includes a plurality of flextensional drop ejectors 172, performs the claimed function. [Spec. at page 9, lines 2-12.]
6. The fuel supply apparatus 118f, which may include an ultrasonic atomizer 194 and fan arrangement (FIG. 19) or an ultrasonic atomizer 198 (FIG. 20) which need not be used in conjunction with a fan, performs the claimed function. [Spec. at page 10, line 25 to page 11, line 9.]

In addition to the elements recited in independent claim 8, dependent claim 9 calls for "storage means for storing energy generated with fuel that is on the anodes when the system is shut down." The disclosed structure for performing the claimed function is an "on-board energy storage device such as a battery or capacitor." [Spec. at page 7, lines 24-26.]

F. Independent Claim 11

Independent claim 11 is directed to a fuel cell system. Referring to FIG. 4, a formal version of which is reproduced below, one example of the claimed system

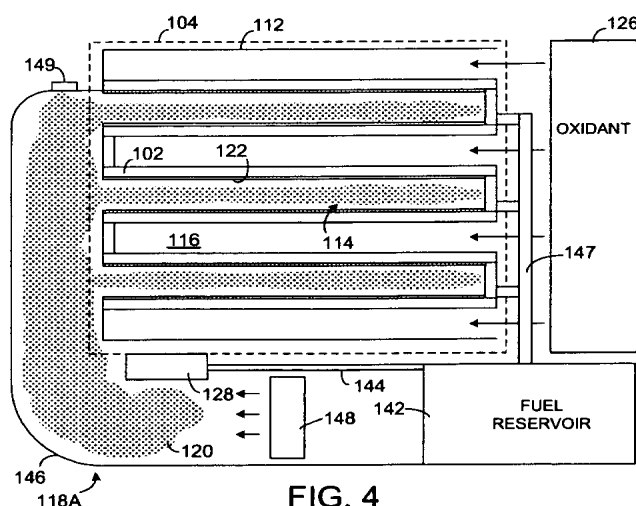


FIG. 4

comprises "a fuel cell stack [104] including a plurality of anodes pairs arranged such that the ***anodes within each anode pair face one another and define a fuel passage [114] therebetween that extends from one anode in the pair to the other anode in the pair***, and a plurality of cathodes." [Spec. at page 4, lines 18-28.] The combination defined by claim 11

further comprises "a fuel reservoir [142]" and "a fuel supply apparatus [118a] that draws fuel from the fuel reservoir and supplies a plurality of fuel droplets [120] to the fuel passages [114]." [Spec. at page 7, lines 9-21.]

G. Independent Claim 14

Independent claim 14 is directed to a method of operating a fuel cell stack. Referring for example to FIG. 3, a formal version of which is reproduced below, the claimed method comprises the steps of “directing a spray of fuel droplets [120] into a

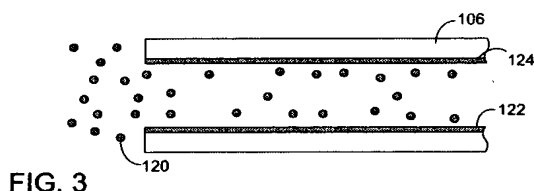


FIG. 3

fuel passage [114] that extends from a first anode [106] in an anode pair to a second anode in the anode pair such that at least some of the droplets come to rest on the first anode and at least some of

the droplets come to rest on the second anode” and “consuming the fuel at the anodes.” In the illustrated example, the droplets 120 that come to rest on the anodes 106 form fuel layers 122 on anode surfaces 124. [Spec. at page 5, lines 3-10 and 21-22.]

H. Independent Claim 16

Independent claim 16 is directed to a method of operating a fuel cell having an anode. Referring for example to FIG. 3 above and to FIG. 7, a formal version of which is reproduced below, the claimed method comprises the steps of “directing a

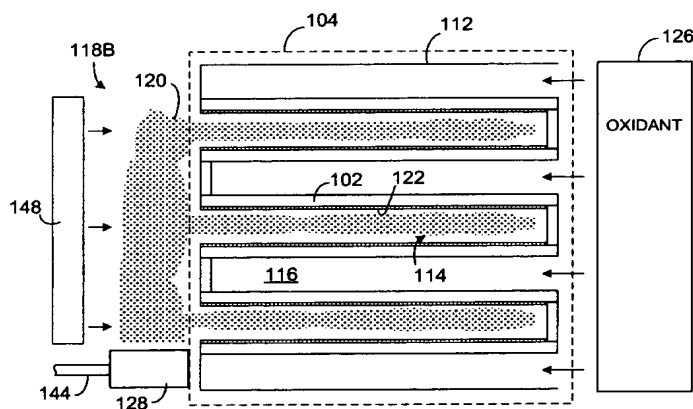


FIG. 7

spray of fuel droplets [120] onto the anode by generating a spray of fuel droplets and blowing the droplets towards the anode ***with a fan [148]***” and “consuming the fuel at the anode.” [Spec. at page 5, lines 3-10 and 21-22; and page 7, line 31 to page 8, line 2.]

I. Independent Claim 20

Independent claim 20 is directed to a fuel supply system for use with a fuel cell including an anode. Referring to FIG. 4, which is reproduced on page 4 of this Brief, one example of the claimed system comprises “a fuel reservoir [142] that stores fuel” and “fuel supply means [118a], operably connected to the fuel reservoir, for supplying a plurality of droplets [120] to the at least one anode.” [Spec. at page 6, lines 4-7 and page 7, lines 9-21.] The other exemplary structures disclosed in the present application for performing the function recited in the means-plus-function element are discussed in Section V-E above. The claimed system further comprises “a controller adapted to monitor a rate of fuel consumption at the anode and to control the fuel supply means to supply droplets **at a rate that results in a fuel layer being maintained on the anode.**” [Note reference character 127 in FIG. 1; and spec. at page 5, lines 17-28.]

J. Independent Claim 82

Independent claim 82 is directed to a fuel cell system. Referring for example to FIGS. 1 and 3, which are reproduced on page 2 of this Brief, one example of the claimed system comprises “a fuel cell [102] including at least one anode [106] defining a surface [124] that receives fuel and a fuel passage [114] adjacent to the anode surface that receives fuel” and “a fuel supply apparatus [118] that directs a plurality of fuel droplets [120] into the fuel passage in a **direction that is non-perpendicular** to the anode surface that receives fuel.” [Spec. at page 4, lines 18-28 and page 5, lines 6-10.] One of the other examples of the invention defined by independent claim 82 is discussed in greater detail below in the context of the objection under 35 U.S.C. § 132 and rejection of dependent claim 83 under 35 U.S.C. § 112, first paragraph.